

What is claimed is:

1. A method of managing a writable-once optical recording medium, the recording medium including at least one recording layer, the method comprising:

providing a user area and a non-user area on the at least one recording layer of the recording medium;

providing at least one temporary defect management area in at least one of the user area and the non-user area, the at least one temporary defect management area allocated to store therein temporary defect management information including disc usage management information, the disc usage management information indicating a recording or non-recording status of the user area of the recording medium; and

providing at least one final defect management area in the non-user area.

2. The method according to claim 1, wherein the at least one final defect management area is provided to store therein the disc usage management information transferred from the at least one temporary defect management area.

3. The method according to claim 2, wherein the at least one recording layer includes a plurality of recording layers each having a final defect management area, and the disc usage management information for each of the recording layers is separately recorded all in at least one of the final defect management areas of the recording layers.

4. The method according to claim 2, wherein the at least one recording layer includes a plurality of recording layers each having a final defect management area, and the disc usage management information for each of the recording layers is separately and correspondingly recorded in the final defect management area of the corresponding recording layer.

5. The method according to claim 1, wherein the recording medium is a writable-once Blu-ray disc (BD-WO).

6. A method of managing a writable-once optical recording medium, the recording medium including at least one recording layer, the at least one recording layer having at least one temporary defect management area and at least one final defect management area, the method comprising:

recording temporary defect management information in the at least one temporary defect management area of the recording medium, the temporary defect management information including disc usage management information indicating a recording use status of the recording medium; and

transferring the temporary defect management information from the at least one temporary defect management area to the at least one final defect management area of the recording medium.

7. The method according to claim 6, wherein the at least one recording layer includes a plurality of recording layers each having a final defect

management area, and in the transferring step, the disc usage management information for each of the recording layers is separately recorded all in at least one of the final defect management areas of the recording layers.

8. The method of claim 7, wherein the disc usage management information includes a first disc usage management information (D0) for a first recording layer of the recording medium and a second disc usage management information (D1) for a second recording layer of the recording medium, such that in the transferring step, the first and second disc usage management information is recorded sequentially in at least one of the final defect management areas of the recording layers according to the following order: D0, D0, D0, D0, D1, D1, D1 and D1.

9. The method of claim 7, wherein the disc usage management information includes a first disc usage management information (D0) for a first recording layer of the recording medium and a second disc usage management information (D1) for a second recording layer of the recording medium, such that in the transferring step, the first and second disc usage management information is recorded sequentially in at least one of the final defect management areas of the recording layers according to the following order: D0, D0, D1, D1, D0, D0, D1 and D1.

10. The method of claim 7, wherein the disc usage management information includes a first disc usage management information (D0) for a first

recording layer of the recording medium and a second disc usage management information (D1) for a second recording layer of the recording medium, such that in the transferring step, the first and second disc usage management information is recorded sequentially in at least one of the final defect management areas of the recording layers according to the following order: D0, D1, D0, D1, D0, D1, D0 and D1.

11. The method of claim 7, wherein the disc usage management information includes a first disc usage management information (D0) for a first recording layer of the recording medium and a second disc usage management information (D1) for a second recording layer of the recording medium, such that in the transferring step, the first and second disc usage management information is recorded sequentially in at least one of the final defect management areas of the recording layers according to the following order: D0, D1, D1 and D0.

12. The method according to claim 11, wherein a certain number of fields, following the recorded first and second disc usage management information, in the at least one of the final defect management areas are reserved for other use.

13. The method according to claim 6, wherein the at least one recording layer includes a plurality of recording layers each having a final defect management area, and the disc usage management information for each of the

recording layers is separately and correspondingly recorded in the final defect management area of the corresponding recording layer.

14. The method of claim 6, wherein the recording medium includes a recording area on the at least one recording layer, the recording area divided into a plurality of tracks, and the disc usage management information represents track position information identifying an end point of a last recorded track on the recording medium.

15. The method of claim 6, wherein the disc usage management information represent a space bit map.

16. The method according to claim 6, wherein the transferring step is performed when the recording medium is to be finalized.

17. The method according to claim 16, wherein the recording medium is to be finalized if a data recording operation in a user data area of the recording medium is completed, if the at least one temporary defect management area is full, or if a finalize command is received.

18. The method according to claim 6, wherein in the transferring step, the transferred temporary defect management information further includes temporary defect list information and temporary disc definition structure

information, and is latest temporary defect management information written on the recording medium.

19. The method according to claim 6, wherein the recording medium is a writable-once Blu-ray disc (BD-WO).

20. The method according to claim 6, wherein in the transferring step, the temporary defect management information transferred is the latest temporary defect management information stored in the at least one temporary defect management area.

21. An apparatus for managing a writable-once optical recording medium, the recording medium including at least one recording layer, the apparatus comprising:

means for providing a user area and a non-user area on the at least one recording layer of the recording medium;

means for providing at least one temporary defect management area in at least one of the user area and the non-user area, the at least one temporary defect management area allocated to store therein temporary defect management information including disc usage management information, the disc usage management information indicating a recording or non-recording status of the user area of the recording medium; and

means for providing at least one final defect management area in the non-user area.

22. An apparatus for managing a writable-once optical recording medium, the recording medium including at least one recording layer, the at least one recording layer having at least one temporary defect management area and at least one final defect management area, the apparatus comprising:

means for recording temporary defect management information in the at least one temporary defect management area of the recording medium, the temporary defect management information including disc usage management information indicating a recording use status of the recording medium; and

means for transferring the temporary defect management information from the at least one temporary defect management area to the at least one final defect management area of the recording medium.

23. A writable-once optical recording medium comprising:

at least one recording layer including a user area and a non-user area;

at least one temporary defect management area provided in at least one of the user area and the non-user area of the recording medium, so as to store therein temporary defect management information including disc usage management information, the disc usage management information indicating a recording or non-recording status of the user area of the recording medium; and

at least one final defect management area provided in the non-user area.

24. The recording medium according to claim 23, wherein the at least one final defect management area is provided on the recording medium to store therein the disc usage management information transferred from the at least one temporary defect management area.

25. The recording medium according to claim 24, wherein the at least one recording layer includes a plurality of recording layers each having a final defect management area, and the disc usage management information for each of the recording layers is separately recorded all in at least one of the final defect management areas of the recording layers.

26. The recording medium according to claim 24, wherein the at least one recording layer includes a plurality of recording layers each having a final defect management area, and the disc usage management information for each of the recording layers is separately and correspondingly recorded in the final defect management area of the corresponding recording layer.

27. The recording medium according to claim 23, wherein the recording medium is a writable-once Blu-ray disc (BD-WO).

28. A writable-once optical recording medium comprising:
at least one recording layer including at least one temporary defect management area and at least one final defect management area,

wherein temporary defect management information is recorded in the at least one temporary defect management area of the recording medium, the temporary defect management information including disc usage management information indicating a recording use status of the recording medium, and

wherein the temporary defect management information is transferred from the at least one temporary defect management area to the at least one final defect management area of the recording medium.

29. The recording medium according to claim 28, wherein the at least one recording layer includes a plurality of recording layers each having a final defect management area, and the disc usage management information for each of the recording layers is separately recorded all in at least one of the final defect management areas of the recording layers.

30. The recording medium of claim 29, wherein the disc usage management information includes a first disc usage management information (D0) for a first recording layer of the recording medium and a second disc usage management information (D1) for a second recording layer of the recording medium, such that the first and second disc usage management information is recorded sequentially in at least one of the final defect management areas of the recording layers according to the following order: D0, D0, D0, D1, D1, D1 and D1.

31. The recording medium of claim 29, wherein the disc usage management information includes a first disc usage management information (D0) for a first recording layer of the recording medium and a second disc usage management information (D1) for a second recording layer of the recording medium, such that the first and second disc usage management information is recorded sequentially in at least one of the final defect management areas of the recording layers according to the following order: D0, D0, D1, D1, D0, D0, D1 and D1.

32. The recording medium of claim 29, wherein the disc usage management information includes a first disc usage management information (D0) for a first recording layer of the recording medium and a second disc usage management information (D1) for a second recording layer of the recording medium, such that the first and second disc usage management information is recorded sequentially in at least one of the final defect management areas of the recording layers according to the following order: D0, D1, D0, D1, D0, D1, D0 and D1.

33. The recording medium of claim 29, wherein the disc usage management information includes a first disc usage management information (D0) for a first recording layer of the recording medium and a second disc usage management information (D1) for a second recording layer of the recording medium, such that the first and second disc usage management information is recorded sequentially in at least one of the final defect

management areas of the recording layers according to the following order: D0, D1, D1 and D0.

34. The method according to claim 33, wherein a certain number of fields, following the recorded first and second disc usage management information, in the at least one of the final defect management areas are reserved for other use.

35. The recording medium according to claim 28, wherein the at least one recording layer includes a plurality of recording layers each having a final defect management area, and the disc usage management information for each of the recording layers is separately and correspondingly recorded in the final defect management area of the corresponding recording layer.

36. The recording medium of claim 28, wherein the recording medium includes a recording area on the at least one recording layer, the recording area divided into a plurality of tracks, and the disc usage management information represents track position information identifying an end point of a last recorded track on the recording medium.

37. The recording medium of claim 28, wherein the disc usage management information represent a space bit map.

38. The recording medium according to claim 28, wherein the temporary defect management information is transferred from the at least one temporary defect management area to the at least one final defect management area when the recording medium is to be finalized.

39. The recording medium according to claim 38, wherein the recording medium is to be finalized if a data recording operation in a user data area of the recording medium is completed, if the at least one temporary defect management area is full, or if a finalize command is received.

40. The recording medium according to claim 28, wherein the transferred temporary defect management information includes temporary defect list information and temporary disc definition structure information, and is latest temporary defect management information written on the recording medium.

41. The recording medium according to claim 28, wherein the recording medium is a writable-once Blu-ray disc (BD-WO).

42. The method according to claim 28, wherein the temporary defect management information transferred is the latest temporary defect management information stored in the at least one temporary defect management area.